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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 15, 1943

Lookout

See Page 314

A SCIENCE SERVICE PUBLICATION

Do You Know?

Chilte, a bush-like tree found in western Mexico, is a possible source of natural rubber; it is known also as Sinaloa gum.

Lightning caused over one-third of the 540 *forest fires* in the National Parks in 1941, more than in any year on record.

Deaf mutes are being used as instructors by an aircraft manufacturer because green hands learn faster from pantomime than from oral instruction, it is claimed.

Natural carnauba wax combined with a special emulsifying agent is the basis of a new floor *wax* claimed to be self-polishing, slip-retardant and water-resistant,

Brazil is reported to have 81 known deposits of *bauxite* suitable for aluminum production and is planning to set up factories to supply home needs.

The Army Signal Corps has announced the establishment of a *quartz* crystal inspection laboratory in Brazil to help select suitable crystals for electrical instruments.

A New England airline company has applied to the Civil Aeronautics Board for permission to operate *helicopters* to carry airmail and air express in New England and New York State, using postoffice and railroad station rooftops for landing stations.

Argentina, long known as a cattle country, has greatly increased its hog production to turn its corn into *pork* for Europe.

Agricultural uses such as ditching, land clearing, stump blasting and other farm activities consume 5,000,000 pounds of *dynamite* a year.

Over 162,000 deer and elk *hides* were sold to leather industries in the United States during the past season, the contribution of sportsmen.

Protective *metal coats* are applied to metal castings, assemblies or structures by the use of metal-spray guns which contain electrically heated melting pots, the spraying being operated by air pressure.

Tons of *timbo* root, rich in rotenone, a powerful insect poison, are being flown from South America to help protect American crops from insect pests, replacing insecticide ingredients formerly obtained from Japan.

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Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

SCIENCE NEWS LETTER

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MEDICINE

New Pregnancy Test

Gives the answer in only two hours and with 97% accuracy. New test uses rats, of which no shortage is reported, instead of valuable rabbits.

➤ A NEW TEST that foretells blessed events with 97% accuracy was demonstrated by four physicians of Mt. Sinai Hospital, New York City, at the meeting of the New York State Medical Society in Buffalo. The doctors presenting the test are Dr. Udall J. Salmon, Dr. Samuel H. Geist, Dr. Charles S. Poole, and Dr. A. Austin Salmon.

Speed and low cost are the chief advantages of this new pregnancy test. Its speed may help save the lives of some women.

The doctor making it can tell within two hours whether or not the woman is going to become a mother. Older pregnancy tests required from 48 to 96 hours to complete.

The new test is made with rats instead of rabbits. Widely used in other pregnancy tests, rabbits are now very expensive, costing as much as $3.50 apiece when they can be obtained. Increasing use of rabbits for meat has caused such a shortage that in the New York City area it was often impossible for days on end, Dr. Salmon said, to get any for pregnancy tests.

The rats cost from 40 to 60 cents apiece, and a doctor can keep two to four rats, which is all the supply he needs, in a box in his office, Dr. Salmon pointed out. Keeping rabbits for the older pregnancy test is a much more involved and space-consuming procedure. There is no shortage of rats, Dr. Salmon said, adding wryly that he doubts whether these animals will be diverted to food purposes.

The new pregnancy test is based on a new observation. If the kidney excretions of a pregnant woman are injected into an infant rat, a marked engorgement of the blood vessels in the rat's ovaries will occur within two hours after the injection. The older pregnancy tests were based on the development, after injection of the same material, of graafin follicles in the test animal's ovaries. This required about 48 hours. Apparently, Dr. Salmon said, no one looked at the ovaries of the test animal immediately, so that the blood vessel engorgement was missed.

The new test has been used in 948 cases. If the patient is pregnant the chances of a correct diagnosis are 97 or 98%. If she is not pregnant, the test is 100% accurate. With tests using rabbits, on the other hand, there was a one-half or one percent chance of inaccuracy in the case of a non-pregnant woman.

The speed with which the new test gives the answer, as early as two hours, and always within six hours, is especially important in cases of ectopic pregnancy. In such cases, the baby is beginning to develop outside the womb and an operation must be performed to save the mother's life. The earlier the doctor knows that the condition is a pregnancy the earlier he can operate and the better the patient's chances. The test also gives positive results in cases of pregnancy accompanied by hydatid mole or by a certain kind of tumor.

Science News Letter, May 15, 1943

DONE WITH MIRRORS—With this optical sighting gage invented by General Electric engineers, the sights of a Garand rifle can be correctly adjusted in less than two minutes and without firing a shot. The job used to take up to 13 rounds of ammunition.

ENGINEERING

New Gage Aligns Sights Of Garands Without Firing

➤ IT'S ALL done by mirrors, without firing a shot. A new precision gage operated by a girl will correctly adjust the sights of each Garand rifle in less than two minutes.

The job formerly took two men twice as long and used up as much as 13 rounds of ammunition on a rifle range. All the rifle now fires during a test is a light ray.

Reflected by mirrors onto a ground glass screen in the image of a cross, the ray permits the operator correctly to position the rifle. Magnified shadows of the front and rear sights are then brought into the same relative positions by adjustment of the rear sight.

The idea for this optical sighting gage was conceived by N. F. Barnes and K. R. Geiser of General Electric's general engineering laboratory. Their colleagues, C. B. Sitterson and William Fears, handled the mechanical engineering and design, respectively.

What the gage actually does is to transfer the sight setting from a master rifle, correctly sighted by actual firing, to rifles sighted in the laboratory equipment.

Science News Letter, May 15, 1943

PUBLIC HEALTH

Death Rate Is Rising; Pneumonia Worrisome

➤ THE DEATH RATE is rising and the pneumonia situation is particularly worrisome, it appears from the Statistical Bulletin of the Metropolitan Life Insurance Company.

A 5.5% increase in mortality among the company's industrial policy holders was recorded for the first quarter of this year as compared with last year's figure. For the country as a whole, an even greater rise in mortality has probably occurred. In the 90 major cities of the United States there were 9.2% more deaths reported for the first 13 weeks of 1943 than for the corresponding weeks of 1942. In New York City the death rate so far this year is about 8.5% higher than for the same period last year.

The war cannot be blamed directly for the increase in mortality, it appears. Among the company's industrial policy holders, the rate for deaths from enemy action for the first quarter of 1943 was more than twice that for the first quarter of 1942, but this, it is said, "does not account for the unfavorable turn in mortality for 1943. Most of the rise in rate this year has resulted from other causes."

Pneumonia seems to be the chief factor. The death rate for the first quarter of 1943 is low compared with rates prior to 1941, but is 21% higher than last year's rate for the first quarter. Virus pneumonia, also called "atypical pneumonia of unknown etiology," has made up a large proportion of pneumonia cases during the past season, and this type of pneumonia is not affected by sulfa drug treatment.

Seeking to allay the fear that the rise in the pneumonia death rate presages another world-wide flu-pneumonia epidemic, the Metropolitan Life Insurance Company health authorities point out that virus pneumonia is different from both influenza and the pneumonia which accompanied influenza in 1918.

"Nevertheless, the situation needs careful watching," they state.

"The war effort would be seriously hampered by an incerase in pneumonia mortality or even by a continuation of the recent level."

Meningitis mortality also increased sharply in 1943. Disquieting also is the increase in deaths from cancer, diabetes, cerebral hemorrhage, diseases of the coronary arteries and angina pectoris and the chronic heart diseases. With the exception of diabetes, the 1943 death rates for all of these are the highest on record.

Fatal accidents in the home have increased, in spite of the fact that there is very little unemployment and less time is spent in the home now than before the war.

Only cheerful spots on the current health picture are the marked decline in maternal mortality, especially noteworthy in view of the increased birth-rate, and the continued decline in the tuberculosis death rate which was 6.8% less in the first quarter of 1943 than in the same period last year.

Science News Letter, May 15, 1943

MEDICINE

Unsafe Jobs for Youths

When boys and girls of 16 or 17 years go to work in a war factory, they should not be placed where lead is concentrated in atmosphere.

➤ WHEN boys and girls 16 or 17 years old go to work in a war factory, there are certain jobs that are safe for them and others which are too dangerous. Grown-ups, for example, can, unless they are unusually susceptible, work in an atmosphere in which there are 1.5 milligrams of lead in every 10 cubic meters of air. Such an atmosphere is not safe for boys and girls, in the opinion of the U. S. Children's Bureau.

Young workers at the age of 16 or 17 are considered in general more susceptible to lead poisoning than older workers. They are less likely to appreciate that special safeguards and personal cleanliness are necessary to protect themselves from the danger of lead and its compounds.

No workers under 18 years of age, the Children's Bureau advises, should be employed at the following types of work:

1. Work in connection with the production of white lead or other salts or oxides of lead.

2. Work in workrooms in which lead salts or oxides are used in such a state that they give rise to lead dust in the air.

3. Work in occupations in which metallic lead is regularly used in the molten state.

4. Work in connection with tetraethyl lead.

Types of work suitable for young workers, provided the work is done in rooms segregated from those in which lead compounds are used in the dry state and are essentially free from lead in the atmosphere, are:

1. Can filling and labeling in paint factories.

2. Marking and testing of storage battery cases.

3. Shipping-department work.

4. Machine-shop, woodworking, and other shopwork not covered by existing regulations.

5. Laboratory work.

6. Office work.

Further details about safe and unsafe work for young workers appear in a series of advisory standards being issued by the Children's Bureau, U. S. Department of Labor.

Science News Letter, May 15, 1943

MEDICINE

New Sulfa Drug Is Two To Four Times as Potent

➤ A NEW sulfa drug has been developed which promises to be a more potent weapon against intestinal infections, such as dysentery, than its predecessors in the sulfa family. Phthalylsulfathiazole is its name. It is announced in a report by Dr. Edgar J. Poth and Dr. Charles A. Ross, of the University of Texas Medical School, to the Society for Pharmacology and Experimental Therapeutics.

It has two to four times the germ-checking power of succinylsulfathiazole. Doses by mouth at four-hour intervals have not caused any toxic symptoms in dog or man.

Science News Letter, May 15, 1943

MEDICINE

Russian Lives Saved

New method of treating brain wounds brings death rate down from 26 per hundred to only 11 out of 100. Closes wound without tube for drainage.

➤ NEW and radical methods of treating brain wounds, by which lives of many Russian soldiers are being saved, were reported by Prof. Vladimir Lebedenko, of the First Moscow Medical Institute, at the meeting of the American Neurological Association in New York City.

American, Canadian and English neurosurgeons, civilian and military, thus obtained for the first time a first-hand account of this phase of Russian military surgery.

The features of treating brain wounds developed by Prof. Lebedenko are:

1. Closing the wound, without tube or pack for drainage.

2. Replacing spinal fluid by air in cases of spinal fistula.

3. Use of what he termed "quartz rays," which American scientists interpreted as being radiation of wavelengths between ultraviolet and X-rays.

In 719 operations, Prof. Lebedenko reported, there were only 90 deaths. The death rate with his methods has been reduced, he stated, from around 26 out of 100 to around 11 out of 100.

A fourth new feature he has developed for treating spinal fistula is the use of a plaster-of-Paris cap, made in a small size just to cover the fistula or opening.

Impressive to American, Canadian and English Surgeons, also, was the fact that Prof. Lebedenko obtains good results with patients operated as long as one month after being wounded. Prof. Lebedenko stressed, as do his colleagues here and in England, the importance of good care after brain operations. He also stressed the use of sulfa drugs to check infection.

FOR NAVY—These high power radio transmitting tubes will enable the U. S. Navy to communicate between ships and shore. They are being inspected in the Westinghouse Lamp Division.

Promise of a weapon better even than the sulfa drugs for fighting infection in brain wounds was held out by Dr. Cobb Pilcher. This is penicillin, the new germ-fighter which English scientsts have extracted from a kind of mold. Sulfa drugs are likely to irritate brain tissue, even causing convulsions. Penicillin apparently does not have this effect and when enough of it is available for this purpose, it should prove a great boon to brain surgeons.

Science News Letter, May 15, 1943

PUBLIC HEALTH

Immune Serum Inhalation May Protect Against Flu

➤ INHALATION of immune serum sprayed from an atomizer may become the future weapon against influenza. The inhalations might be used both to ward off an attack and as a remedy for the disease.

This method of prevention and treatment of influenza is being investigated by the Naval Laboratory Research Unit No. 1, under the direction of Commander Albert P. Krueger, at the University of California.

Mice given inhalations of a globulin fraction of influenza immune horse serum were protected aganst influenza, the degree of protection increasing with the duration of inhalation, the Naval researchers now report to the American Association of Immunologists.

Treatment with the immune serum was effective when given as long as 48 hours after the mice got influenza. Repeated treatments 24 hours apart were significantly more effective than one treatment.

Inhalation, the scientists found, is a better method of giving the protective and remedial immune serum than dropping it up the nose. Experiments on monkeys and mice with India ink and with radioactive chromic phosphate as indicators showed that with inhalation the material is uniformly distributed and penetrates to the outermost air sacs of the lungs at the ends of the bronchial tree.

Danger of humans getting allergic reactions to the immune horse serum has been overcome or at least reduced by treating the serum with certain enzymes. Evaluation of this treated serum as a preventive and remedy for experimental influenza is in progress.

Science News Letter, May 15, 1943

PSYCHOLOGY

Tests for Spotters

Anti-aircraft gun crews require good perception of depth and distance as they watch stream of tracer bullets to observe hits or misses.

➤ THE JOB of spotter in an anti-aircraft crew, which requires him to watch the stream of tracer bullets and observe how close they come to hitting the target enemy plane, is a task that makes unusual demands on eyesight.

Special vision tests for selecting men for this job and for the job of anti-aircraft gunner are described (*Military Surgeon,* April) by Captain Erwin E. Grossmann, of the U. S. Army Medical Corps. He also described a new range-finder device to improve the distance perception of anti-aircraft spotters.

The purpose of most of the tests is to measure the various factors entering into the ability to judge distances and depths or heights, and particularly the ability to judge which is the farther of two distant objects such as an airplane and the tracer bullets shot at it.

The distance of an airplane or other object is usually judged by the two eyes working together. Each eye sees a somewhat different image of the object, and the two views are somehow blended by the brain so that, unless you are greatly fatigued or drunk, you actually see one airplane, not two. The amount of pull on your eye muscles to produce this fusion into one image is immediately translated by you into an estimate of distance, without your even being aware of how you do it. If you should cover up one eye, however, you would realize how much more difficult it is to see depth and distance.

Difficult at Distance

But with both your eyes unaided, you cannot see any difference in distance between two airplanes or other objects, if they are more than 500 yards away from you, Capt. Grossmann points out. To judge relative distances farther away than that, it is necessary to do two things. First, you must, in effect, put your eyes farther apart than Nature has. Second, you must magnify the image by using a telescope.

This, Capt. Grossmann says, is the principle in back of the height finder, the instrument used by the anti-aircraft to sight and locate the target and to establish the proximity between projectile and target.

The great body of soldiers assigned to the shorter range guns in the anti-aircraft units do not use such special optical instruments, however. They have had to rely on the accuracy of their unaided eyes.

Col. Maurice Morgan, of the Camp Hulen Anti-Aircraft Training Center, Texas, found that some of the men badly underestimated the relationship of the tracer bullet to the target sometimes, while their accuracy was phenomenal at other times. He decided that this breakdown in accuracy might be due to an increased distance of the target, and so he started looking for an optical device that could be provided for these men and which would not have the prohibitive cost of the height finder. He wanted a gadget that would increase the effective range of his spotters to about 1,500 yards, or between 4,000 and 5,000 feet.

Col. Morgan has now completed this device and is gratified with the results in actual training practice, Capt. Grossmann reports.

The eye tests adopted for use at Camp Hulen consist, Capt. Grossmann says, of a combined selection of tests taken from those of the Height Finders School and the Air Corps, with a few minor modifications. The stress is laid mainly on depth perception and the factors contributing to it. These factors are:

1. External eye pathology, especially of the lids. This has no direct effect on depth perception, but it does contribute to eye fatigue. "A watery, injected, (bloodshot) itching eye is not a good prerequisite for the full and satisfactory functioning of the fusion faculty," Capt. Grossmann said. "Nor is such an eye the ideal to be desired in those required to minutely observe the approach of an enemy plane. Those who have an abnormal sensitivity to glare should also be eliminated."

2. Inequality of vision. Since depth perception is a function of the binocular vision, it is evident, Capt. Grossmann points out, that inequality of vision will seriously interfere with its efficiency.

3. Inequality of refractive error. If the refractive error is different in one eye from what it is in the other, you will be tricked into a false impression of distance.

4. Color vision. This is ordinarily not involved in distance perception, but it is necessary for the gun crew to be able to distinguish the American colors from the Japanese, for example. And tracer bullets, Capt. Grossmann points out, are either phosphorescent red or blue in color and change their hues according to the distances at which they are viewed.

5. Muscle imbalance between the two eyes.

6. Internal ocular pathology.

Science News Letter, May 15, 1943

PHYSICS

Einstein Sends Message To Puebla Conference

➤ PROFESSOR Albert Einstein in a message to the First National Conference on Physics in Puebla, Mexico, conveyed his thanks to Mexico for offering European intellectuals a new home and an opportunity for new and fruitful work.

The message of the founder of relativity was read to the conference by Dr. Harlow Shapley, leader of the American delegation and director of Harvard College Observatory, when he responded to the official welcome extended by Governor Gonzalo Bautista of Puebla.

"In this time of brutal lust of power and barbaric persecution which have debased the continent of Europe, Mexico is performing an important work of salvage," Dr. Einstein's message read. "We are grateful to her for offering to European intellectuals a new home and an opportunity for new and fruitful work. In addition, Mexico has more than any other country opened her doors to the Spanish soldiers of freedom and rescued many from a shocking end.

"Mexico, preserving her complete independence and her free traditions, has associated herself with the United Nations in their struggle against Fascist oppression. May your country, which also we have to thank for a new flowering of the art of painting, experience all the blessings its courage and humanity so richly deserve and may the newcomers you have welcomed among you enrich the intellectual and economic life of your beautiful country."

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PSYCHOLOGY

More Women Reach 100

Centenarians studied by psychologist are busy people with plans for the future. They have hobbies, romances and sense of humor.

➤ IF YOU want to live to be a hundred, marry, keep busy, love romance, make plans for the future, have pride in your personal appearance, develop a hobby and sharpen your sense of humor.

This would seem to be the prescription that might be written as a result of a study of a twenty-year crop of centenarians numbering 450 made by Dr. Grace E. Bird, professor emeritus of the Rhode Island State College of Education. Of these, 350 are still living.

"Life for some may begin at 100, instead of 40," Dr. Bird told the Eastern Psychological Association meeting in New York. She located the long-lived men and women of her study with the aid of two Eastern newspapers, but the individuals themselves were located in every state of the union.

About twice as many women as men live to be 100 or more, and all but eight of the women were married. Many had raised large families of children.

All were interested in life and most of them in romance. One lady cynically stated that she was "through with men," but she was just recovering from a recent disappointing romance with a 77-year-old suitor.

A man at the age of 111 regretted that his 30 children were not present on his birthday.

The jobs of men and women over 100 are varied and may be strenuous. One man at 100 is an airplane spotter. Another chops wood. A woman, at 100, works in her son's candy shop. One man was appointed deputy sheriff at the age of 100. Another man supervises the care of 68 cattle, six horses, and two mules in Arizona. One woman is an artist still painting. One preaches in a small church every Sunday.

One centenarian, still alert, was rejected as a volunteer for the Civil War, because he was at that time considered physically unfit.

Many of the group are college graduates. Six were high ranking Army officers, one a United States Senator, three clergymen, one a teacher, three physicians and one a film actress who made her debut in Hollywood at 100.

When physical old age slows down activity, the aged can be an inspiration instead of a burden if their mental powers are preserved," Dr. Bird concluded. "Under right conditions there is no known limit to their usefulness."

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ENGINEERING

Air Forces Number 13

Air Transport Command which supplies them is world's biggest air line with four routes to England, Africa, China and Australia.

➤ THE PRESENT American air war of global extent, being fought on many fronts by 13 organized air forces, is possible because of the speed with which the Air Transport Command was organized and the efficiency with which it has carried out its hazardous task, declared Lieut. Col. Nathaniel F. Silsbee of the United States Army Air Corps, speaking before the Aviation Division of the American Society of Mechanical Engineers. He called the expansion of the Air Transport Command in a few months' time phenomenal.

"Taking advantage of the vast pioneering experience of Pan-American, and ably assisted by many of our domestic lines, the Air Transport Command . . . developed four great airways and in terms of distance and volume of traffic has become the world's biggest air line," Col. Silsbee stated.

"The four routes are the North Atlantic to England; the South Atlantic to Africa, via South America; and from Africa to Iran, India, and China, the South Pacific to our island bases and Australia; and northwest to Alaska."

These routes are "aerial life lines". No fighting front is more than 50 to 60 hours distance from any other front or from the home bases. Over these routes hundreds of transport and cargo planes are daily carrying men and munitions, parts and supplies for the round-the-world air force and other fighting units.

Speed in delivering men and war equipment is all-important, the speaker declared. Spare parts for replacements in warplanes damaged in fighting must be rushed to the scene of action so that the planes may be quickly repaired in the field and returned to service. War equipment delivered to fighting men to meet emergencies has been the turning point on several fighting fronts. Urgently needed parts flown to Egypt helped to turn Rummel, and again air-carried equipment prevented the Japs from taking Port Moresby and Guadalcanal.

Col. Silsbee discussed the various types of airplanes and the part each is playing in the war. "There is no 'best' plane," he said. Each plane does best what it is designed to do.

Science News Letter, May 15, 1943

GENERAL SCIENCE

National Academy Medals Awarded to Scientists

➤ THE HONORS list of the National Academy of Sciences meeting in Washington was as follows:

The John J. Carty medal and award for the advancement of science for 1943 to Dr. Edwin Grant Conklin of Princeton University and president of the American Philosophical Society, in recognition of his services to science as zoologist, cytologist, embryologist; philosopher, teacher and scientist; student of life and of growth from lowliest beginnings to highest confirmation.

Henry Draper Medal for 1942 to Dr. Ira Sprague Bowen of California Institute of Technology in recognition of his contribution to astronomical physics.

Agassiz medal for 1942 to Dr. Columbus O'Donnell Iselin, II, Director of Woods Hole Oceanographic Institution.

The Daniel Giraud Elliot medal for 1936 to Dr. Robert Cushman Murphy, of the American Museum of Natural History.

The Daniel Giraud Elliot medal for 1935 to Dr. Edwin H. Colbert of the American Museum of Natural History.

Science News Letter, May 15, 1943

GEOLOGY

Deposits of Tantalum Ore Found in New Mexico

➤ THE DISCOVERY of new ore deposits of the rare metal tantalum in New Mexico, which promise high productivity, is welcome news to war manufacturers who use this metal and its compounds.

Tantalum's first commercial use was in electric lamps, then it jumped into prominence by its use in radio tubes. Because of its power to resist corrosion, it is used in surgical and dental instruments, electrical contacts, pump and valve parts and temperature control apparatus. Carbides of tantalum are used in wire-drawing dies, steel-cutting tools, wear-resistant parts of machines, and in dies for cold-nosing artillery shells.

Although tantalum ore has been mined in Wyoming, South Dakota and New Mexico, the principal source has been abroad. The new deposit, if it meets expectations, may supply the principal needs, at least during the war.

The new ore body was found in a pegmatite deposit in New Mexico by a private geologist. Samples sent to the United States Bureau of Mines pilot plant at Rolla, Mo., resulted in the shipment to that station of 30 tons of the ore, from which over three tons of high-grade concentrate were obtained. This is being taken over by the Metal Reserves Company, a federal agency, at $7,000 a ton, according to the Bureau of Mines.

The discoverer is reported to be planning to erect a local concentrate mill as soon as possible if further explorations indicate an ample supply of the ore.

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ENGINEERING

Cold Welding Used To Save Cracked Cylinder Heads

➤ THE DEVELOPMENT of a special alloy which has the lowest temperature coefficient of expansion of all known alloy, has brought success to the method of salvaging cracked automobile engine cylinders and blocks by the cold-welding or lacing process, A. B. Tincher of Kerkling and Company, Bloomington, Ind., told the Society of Automotive Engineers meeting in New York.

This alloy has a very high conductivity of heat units, he stated, and used in connection with it is a metallic seal developed especially for this purpose. Both the alloy and metallic seal are reported to be available commercially.

The wide acceptance of cold welding today "is the result of consistent improvement and technical development that has perfected a method so simple it may be understood and used by the average garage mechanic," according to the speaker. He describes it as "a mechanical lacing process, using taps, dies, drills and metal rod."

A channel the width of the diameter of the metal to be used is cut along the crack, about one-sixteenth of an inch deep. The ends of the crack are drilled to prevent its further development. Threads are cut in the holes drilled, and the special rod is screwed in and cut off. Then the crack is drilled and tapped its entire length and the special rod inserted so that each stud interlocks with the one next to it.

The sealing compound is then circulated through the cooling system of the engine, and the job is completed. Engines used in all types of cars and trucks have been repaired by this method, and the repairs are reported to last as long as the engines.

Science News Letter, May 15, 1943

MEDICINE

Nerve Fragments Frozen For Later Use as Grafts

➤ A METHOD for storing fragments of nerves for future use as grafts, somewhat as blood is now stored for future use, was announced by Dr. Paul Weiss, of Chicago, at the meeting of the American Neurological Association in New York.

The nerve fragments can be stored indefinitely without losing their effectiveness as grafts, Dr. Weiss reported.

The nerves are frozen at 150 degrees below zero Centigrade, dehydrated in a high vacuum, sealed in and stored in the dry condition. They are rehydrated before use.

"This treatment," Dr. Weiss said, "leaves the histological, biophysical and biochemical properties of the nerve essentially unharmed. When grafted, such nerves are readily and fully pervaded by regenerating nerve fibers, much as if they were living."

Sleeves of fresh or frozen-dried arteries are another aid to the neurosurgeon. With their aid, nerve stumps can be spliced without being sewed together and "practically ideal nerve regeneration has been obtained," Dr. Weiss reported.

Science News Letter, May 15, 1943

IN SCIEN

MEDICINE

Penicillin, Disease Remedy, Scores New Triumph

➤ PENICILLIN, potent disease remedy obtained from mold, has rung up another triumph over its rivals, the sulfa drugs.

Germs grow resistant to penicillin's ability to check their growth, just as they grow resistant to sulfa drugs, making the latter ineffective as remedies in some cases. Strikingly unlike their resistance to the sulfa drugs, however, their resistance to penicillin is accompanied by a decrease in their virulence. Studies showing this, made with Type III pneumonia germs and mice, are reported by Dr. C. M. McKee and Dr. C. L. Houck, of the Squibb Institute for Medical Research, to the American Association of Immunologists.

Science News Letter, May 15, 1943

ENGINEERING

Invisible Rays Dry Molds for War Casting

➤ INVISIBLE RAYS now dry molds for war castings in about an hour-and-a-half, reducing labor requirements by three-fourths.

This new application of the widely used infra-red rays was reported to the American Foundrymen's Association meeting in St. Louis, by L. M. Duryee, Connecticut Light & Power Co. engineer.

Navy casting specifications call for uniform surface smoothness that posed a problem under old methods of drying the green sand molds. Then infra-red rays were tried.

Tests showed that drying commenced within 30 seconds; 90 minutes later metal was being poured into the molds. And the castings met all inspection requirements for war equipment.

No labor is required during the new drying process; men who formerly did the job by using torches and charcoal are freed for other war work.

The method is now finding its way into foundry practice throughout the nation, further expanding the use of infra-red rays. They already have important war uses, such as the quick-drying and baking of painted military equipment.

Science News Letter, May 15, 1943

E FIELDS

PSYCHOLOGY

Most People Can't Identify Their Own Handwriting

➤ IDENTIFICATION of handwriting by lay witnesses is not reliable evidence for use in court cases, it is revealed by a scientific experiment reported to the Eastern Psychological Association meeting in New York. Only four out of ten persons were able to identify their own handwriting correctly after several weeks.

The test was made on 181 men and women of 17 to 42 years and coming from 39 states, Alaska and four foreign countries. The experimenters were Dr. Steuart Henderson Britt, of the Office of Psychological Personnel, National Research Council, who is a lawyer as well as psychologist, and Ivan E. Mensh.

The persons tested were not told the purpose of the experiment when the samples of handwriting were obtained.

Science News Letter, May 15, 1943

PSYCHOLOGY

Nazism May Spring Up Where Ground Is Fertile

➤ NAZISM is an evil that may spring up in other countries besides Germany if social and cultural conditions are permitted to form fertile ground for it, Prof. Max Wertheimer, of the New School for Social Research, warned psychologists at the meeting of the Eastern Psychological Association in New York. Prof. Wertheimer, before he came to this country, watched the development of Nazism and Facism in Europe.

"When young people feel that they have no place in the world, nothing to look forward to in the future, and when they do not know what to do about social problems crying out for solution —then they may become ready to follow a leader like Hitler who promises them a place of usefulness," Prof. Wertheimer declared.

"I saw many students join the Nazis," he said. "Many were idealistic young men who wanted to do something useful, to be somebody, to feel that they were needed.

"They didn't realize at that time how blind they became and what tragedy they were building."

The authoritarian type of society is developed by education of the children, Dr. Ruth Benedict, anthropologist of Columbia University told the same meeting. If children are consistently rewarded for fitting into the authoritarian pattern and punished for seeking independence, gradually the authoritarian way of life will dominate the tribe or nation, she said.

The authoritarian type of character, she explained, is one that sees all people as divided into those having power and those not having power. Some class of people is always being seized upon and made submissive—either young people or old people, women, or certain occupations. The one thing they cannot tolerate is for any other group to seek independence.

Science News Letter, May 15, 1943

MEDICINE

New Medical Treatment For Goiter Announced

➤ SUCCESS in the first trials of a new method of treating goiter by medicines instead of by surgical operation is reported by Dr. E. B. Astwood, of Harvard Medical School (*Journal, American Medical Association,* May 8).

The medicines used are thiourea and thiouracil. They have the unique property of inhibiting the function of the thyroid gland, actually, it is believed, preventing production of its powerful hormone.

Patients with the kind of goiter in which popping eyes, extreme nervousness and thinness are symptoms suffer from too much thyroid hormone. This excess hormone drives the life processes at too fast a pace and even acts as a poison in its effects on the heart.

Operation to remove part of the gland and thus reduce the amount of hormone produced has so far been the chief method of treating the condition. The results reported by Dr. Astwood suggest that patients in future may not need to have this operation but can have their too-active thyroid glands kept under control by taking daily doses of thiourea or thiouracil.

Further studies, Dr. Astwood points out, will be needed to determine the best and safest methods of using these new medicines for long term treatment.

Science News Letter, May 15, 1943

RESOURCES

Powdered Bituminous Coal Mixed with Heavy Fuel Oil

➤ POWDERED bituminous coal mixed with heavy fuel oil may be used in industrial plants for heating and power during the remainder of the oil-shortage period, if tests now under way give the results expected. These tests are being made by the U. S. Bureau of Mines in cooperation with an oil refining company in one of its Eastern industrial plants.

Studies made by the Bureau of Mines seem to indicate that a coal-oil fuel can be made that may be used successfully in existing boilers in industrial plants with no loss in plant efficiency. It is not proposed to use it in home heating plants, but the saving in oil that may result from use of the mixture in heavy industries would alleviate the serious petroleum shortage along the Atlantic seaboard.

The mixture now being tried consists of approximately 60% oil and 40% pulverized bituminous coal. Coal with low ash content is used. It is proposed that the mixing be done in central mixing plants and delivered to the consumers ready for use.

The tests now under way are designed to determine the types of boilers and furnaces in which the coal-oil mixture may be used, the amount of ash in the coal, the fusion temperature of the ash, and the best method for removing the ash from the boilers.

Science News Letter, May 15, 1943

NUTRITION

Alaskan Caribou May Be Additional Meat Source

➤ AN ADDITIONAL, untapped source of meat exists in the domesticated caribou (reindeer) herds of Alaska, Dr. William H. Hobbs, emeritus professor of geology, University of Michigan, suggests (*Science,* April 23).

The domesticated herds in Alaska number from 50,000 to 100,000, with millions more in wild herds in Alaska and Canada, Dr. Hobbs states. Caribou meat, in his opinion, surpasses the best venison and the best beef in taste, having something of venison's gamy flavor with a juiciness more like that of beef.

"As the domesticated herds are largely in northwestern Alaska near the Bering Sea," he points out, "it would be possible to ship the refrigerated meat by sea to our bases in the southwest Pacific and to our own Pacific ports."

Science News Letter, May 15, 1943

PSYCHOLOGY

Seeing in the Dark

Navy lookouts are given special training with ship models displayed on dimly lighted stage to enable them to get the first look at the enemy.

By MARJORIE VAN de WATER

See Front Cover

➤ THE BLACKED-OUT darkness of a wartime sea has made the job of Navy lookout much more difficult and extremely more important.

To sight the vague shadowy blob on the horizon that is a distant enemy warship. To spy the tiny dot that is a deadly submarine periscope. And to recognize these danger signals swiftly before the enemy has a chance to strike. This is the job of Navy lookout. On him depends the safety of the ship—the safety of the nation.

Death strikes swiftly in modern naval war. And it strikes at great distances. In five seconds—less time than it takes for the lookout to blow his nose—the deadly torpedo can be launched, destruction is already on the way. No time for a second glance to make sure. No time to think it over.

To train men how to use their eyes in the black of moonless nights and to make these split-second observations, the Navy has developed a new device—a stage where the lighting effects are duplications of the faint starlight, glowing dawn, swift lightning, the faint red glare of a fire at sea, or the careless diffused light backdrop of a badly dimmed-out coast.

Accurate Models

The "principals" of the drama on this new kind of stage-with-a-purpose are precision-accurate models of the lumpy looking Japanese warships and the sleek business-like vessels of the Nazis.

The lookout in training winds his way through a passage of light baffles which insure complete darkness within the training room. He sits on one of a series of benches. Before him is the stage —a length of horizon, dark sky above dark water.

It is not so long as you would see were you walking the deck of a steamer That is because the Navy lookout doesn't have to watch the whole sea. He is charged with responsibility for one particular area which he must scan, letting his eyes rest for a brief interval at point after point, systematically covering the area.

While he sits in the blackness, letting his eyes grow used to the dark, an instructor tells the lookout about the way his eyes work at night. He learns that night vision uses a different set of nerve cells called the rod cells and that these are placed around the outer part of the eye's retina instead of in the center as are the daytime cone cells.

For this reason, night eyes are blind in the exact center of the eye—the very place that is the best for seeing things in the daytime. In the night, therefore, it is necessary to break the habits of a lifetime and look somewhat away from what you want to see—not directly at it. You must look a little above, a little below or to the right or left. When you look straight at the vessel you have spotted, it will disappear like a ghost ship.

Night eyes, he learns, are color blind. Nothing counts at night except the delicate differences in shades of black or gray by which you can tell the solid form of a ship from the sky beyond it.

Night eyes do not see clearly and sharply as do day eyes. Vague, blurry outlines are all that you can make out. You must be able to tell, without seeing any more than that, what sort of object is in the sea and whether it is friend or foe.

Can't See Colors

Night eyes are very much more sensitive to faint light than are day eyes—thousands of times. After sitting in the darkness for 20 to 30 minutes, or with eyes protected by the Navy's new red goggles, the lookout is using his night eyes. The rod cells have taken over the job of seeing for him.

But even the sensitive rods are incapable of seeing anything in the complete darkness of the training room. City dwellers have never seen such utter blackness, unless it is in a photographic darkroom.

But now the dawn breaks on the stage. It does not come up like thunder. Some eyes cannot see it at all. I couldn't. Well, I did think I could barely make out traces of a difference between sky and sea, but I was not even sure of that.

Men differ greatly in night vision. There are men who can see in that faintly reduced darkness. They can spot ships with no more light than that. These are the men who make best lookouts. And Navy men know that some Japs have that kind of night vision, too —and some Germans.

A little more light and I could begin to see. Yes, there was definitely a horizon now. As I looked toward the center of the stage, I thought I could make out a vague blur off to the right. But when I turned my eyes that way there was nothing. I could see it only with the tail of my eye, and then so faintly that I couldn't be sure.

Some See More

Yet that sort of vague impression is often all that a lookout ever sees of a submarine or a plane or a warship before the torpedo or the bomb is launched. Some men can see much more at this illumination. They can not only tell you from which direction a ship is approaching, they can tell that it is battleship, cruiser or destroyer.

But if your eyes are not adapted to the darkness, you see much less. Even a brief look at an instrument by a bright flashlight will spoil night vision so that the enemy cannot be seen at all.

Now the dawn is really coming. It is still black in the room. You can't see your own hands held before your face. But the eastern horizon has enough faint glow so that you can see, to your surprise, that there is not just one ship, but a whole convoy sailing along.

All you need now is the smell of salt air and the throb of engines and the swell of the sea beneath your feet to complete the effect. There is the enemy! And in force! But then you are sobered by the thought that if you had not seen him long before this, he would have seen you!

Nature has her bag of dramatic lighting effects, you learn in this training room. Maybe you have never conquered a childhood fear of the crackle and bright flash of lightning, especially lightning at sea. But if you are a Navy look-

out, you will. For a stroke of lightning, instantaneous though it is, gives you a sudden glimpse of all the details in your lookout area, flooded with all the light of day. In that split second, you can see masts and guns and other details imperceptible before. You can see colors. You can see the bright reflection of light on shiny surfaces.

And war brings its own strange lighting. Off to the left of the horizon there is the ruby glare of a fire at sea. That means tragedy for us or for the enemy. It means also a new strange light in which to try to see our own hazards. And we know that the burning ship is not alone, for now comes the bright flash of gunfire.

Gunfire is not like lightning. It does not light up the whole scene. It will not help in seeing a ship unless the flash is behind it and shows it up in silhouette. But it may blind us if we are looking straight at it. So bright a light will spoil the vision of the sensitive rod cells.

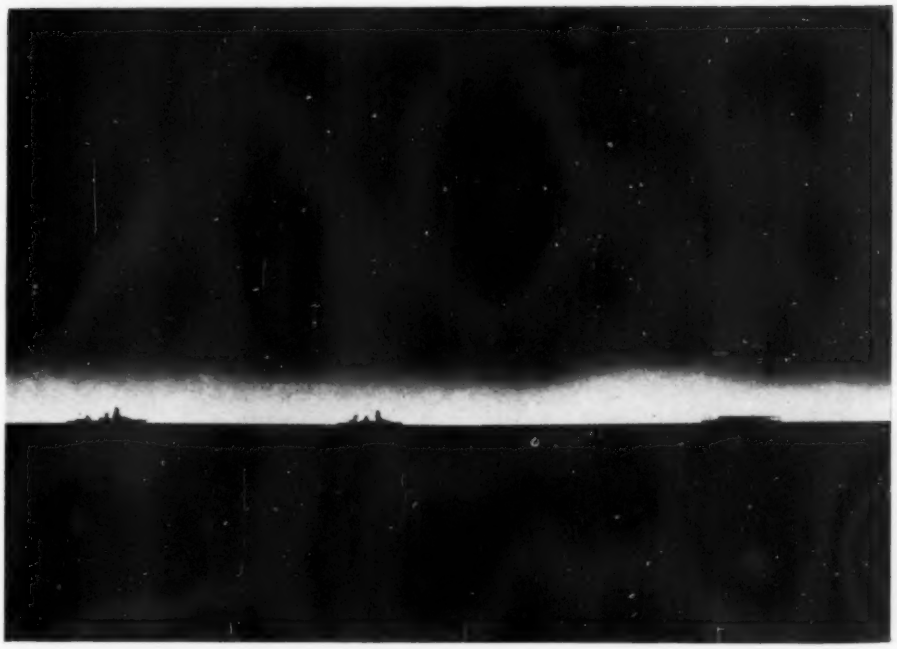
Training Helps

Although men's eyes seem to differ in sensitiveness to the faint light of the night sky, it is possible for individuals to improve greatly in the way they use their eyes—in their ability to see with the visual equipment they have.

It often means breaking habits that are thoroughly ingrained. In the daytime, the best part of the eye for seeing is right in the center. Without thinking, we turn our heads or our eyes to look directly at what we want to see well. That is the best way to see clearly with the cone cells. At night this part of the eye is blind, and we must look away from an object in order to see it at all. It is hard to go contrary to our habits to do this. It takes long and patient practice.

In the daytime we want to take a good look at a thing and see its details clearly before we try to recognize it. In the night, we never see detail clearly. It is necessary to recognize objects on the basis of a general impression, a hazy sort of overall perception in which all details are lost—blocked out. This, again, is contrary to the habits of a lifetime. It takes practice.

The value of such practice is shown in a dramatic way. One man had had an illness that caused a hemorrhage in one of his eyes as a result of which the center of that eye was completely blind. With that eye he was unable to see anything he looked at directly—a disability for daytime seeing. But when he came to take the training for seeing at night, it was found that his vision was much better in his "bad" eye. With that eye he had learned the trick of looking away to see things.



LOOKOUT TRAINING—In modern naval warfare, the lookout who gets the first glimpse of the enemy is on the ship with the best chance of survival. In a special program of training, U. S. Navy lookouts learn to identify enemy ships at night or in the uncertain light of early dawn by studying models on a special dimly illuminated stage. This photograph and the one on the front cover are official Navy photographs.

The Navy's new night vision training stages are not the only places where training in night vision could be given. At New York, Philadelphia, Chicago and Los Angeles are buildings called

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Professor George A. Baitsell, Executive Secretary, Yale Station, New Haven, Connecticut, will gladly inform inquiring members about the simple procedure to secure these advantages of active connection with THE SOCIETY OF THE SIGMA XI.

planetariums where special projectors can reproduce the stars of the night skies at any time or season. These were originally intended to give the public a chance to study the stars. Now plans have been made to use them also to teach men in the armed services how to see at night and how to plot a course by the stars.

If you are a volunteer airplane spotter or night air raid warden and you live within easy traveling distance from one of these planetariums, you may be able to arrange to get this sort of training.

The planetarium is used in much the same way as the lookout training stage of the Navy. In the room lighted only by the "stars" you learn to see and recognize ships or airplanes, or the water tanks and towers of a landscape with the "tail of your eye."

The Canadian Army has developed another method, using silhouettes projected on a screen.

Of course none of these training devices are as good as is the open, unlighted sky of night. But unfortunately (or fortunately) opportunities to practice seeing the enemy under perfectly natural conditions are limited. As the instructors tell the lookouts under training:

"You may never in your whole life see but one enemy submarine."

Science News Letter, May 15, 1943

PSYCHIATRY

Defends Army Psychiatry

Feeling that they are not "at end of the road" helps patients to improve. Also contributing to their improvement is continued contact with world and duty.

➤ CRITICISMS of the Army disposition of soldier mental patients by getting them out of the service as quickly as possible are combatted by Lieut. Col. William C. Porter, Capt. John G. Novak and Lieut. Paul V. Lemkau, all of the U. S. Army Medical Corps (*Military Surgeon*, April).

Because it is frequently impossible ever to restore the mentally ill soldier to combat duty, it is the duty of the psychiatrist to rid the Army of the dead weight of the casualty and to do this as rapidly as possible, these Army physicians explain. Criticisms of this Army attitude, they say, are based on the assumption that the patient is habitually neglected during the three to six months usually required to dispose of a psychiatric casualty.

This assumption, the psychiatrists say is "equivalent to saying that a medical officer would allow a wounded soldier to die because he had had a leg injured so severely that he would never again be able to march. The therapeutic interest of the psychiatrist is as great in most instances as it would be if he were trying to save the life of the hero of a battle who had unfortunately sustained an irreparable wound."

Actually, the feeling that they will not remain long in the Army psychiatric ward but will soon either be returned to duty or sent back to civilian life, is a factor contributing to the improvement of the patients, the Army physicians indicated. The patients realize that they are not at the end of the road. They know that permanent hospitalization in the Army is impossible.

Another beneficial aspect of the Army psychiatric treatment is the fact that the patient is not declared legally irresponsible. He is called upon regularly to sign the pay roll and to endorse his pay checks, though his money is held for him by responsible officers. This money cannot be spent without the patient's written consent in the form of his signature on a request that the check be drawn and then an endorsement on the check itself. He is allowed and encouraged to send reasonable amounts home to his dependents. This keeps him in active touch with real life.

He is also kept linked with the world of normal people by his Army uniform. This is not his regular duty uniform, but it is a standard uniform worn by all patients whether they have been wounded in battle or are mentally or physically ill.

The mentally ill soldier is expected to follow the usual military courtesies that he has been trained to observe before his illness. This has proved helpful to the patients.

"It is a frequent observation that well trained soldiers, when they become psychotic," the report states, "are, in general, less disturbed than are recruits. Self-discipline takes the place of the restraining sheet in the military hospital and military discipline lends its aid to self-discipline in this relatively non-personal way."

The soldier patient has the benefit of early hospitalization, for any sort of bizarre or unusual behavior is immediately noticeable in Army life although it might escape notice or treatment for long periods in civilian life.

The medical officer in charge of soldier mental patients has double responsibility, the report explains. First, he is an officer in the Army and must discharge his duty to the military establishment and devote himself primarily to the needs of the combat arms. For this reason he must often prevent the soldier who has broken under the strain of combat from going back into full service—frequently a great blow to the patient. Secondly, he is the therapist, anxious to see his patients improve and recover.

But the patients generally grasp the significance of this dual role very clearly, the report states.

Science News Letter, May 15, 1943

MATHEMATICS DICTIONARY

Invaluable in reading any book that uses mathematics.

THE JAMES MATHEMATICS DICTIONARY,

the only such book now published, provides standard definitions of the terms and phrases from arithmetic through elementary differential equations, the technical terms ordinarily used in the applications of these subjects, and more advanced basic terms. Easy examples, many illustrations and all sorts of formulas are included. The appendix contains tables of weights and measures, a list of mathematical symbols and the tables ordinarily used in handbooks.

This dictionary is a great deal more than a collection of definitions. It explains, illustrates and correlates, stressing especially those operations that are hardest to understand. One reader has called it "**Ten texts in one.**"

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ENGINEERING

Low-Cost Method Speeds Discovery of Defects

➤ EXAMINING light alloy castings by fluoroscopy saves time and expense. X-rays throw an image on a fluorescent screen but no photograph is taken just as many shoe stores do to fit your foot correctly.

British experience with the method and development by the Robert Mitchell Co. was reported by the firm's metallurgist, A. E. Cartwright of Montreal, Canada, to the American Foundrymen's Association meeting in St. Louis.

Although the new method is not as sensitive as the usual X-ray photograph procedure, it is practical for speedy, low-cost examination of the increasing war volume of many low-stressed aircraft and industrial castings.

Science News Letter, May 15, 1943

PRIMATOLOGY

NATURE RAMBLINGS

by Frank Thone

Beastly Behavior

➤ ANIMAL ANALOGIES for human conduct have long had folk-recognition in such popular terms as hoggish, bearish, wolfish, foxy, catty, mousy, fishy, even serpentine and reptilian. If the animal's own conduct is well enough known to be recognized as complex, its image may be used in both praise and condemnation. A man's friends may praise his dog-like fidelity, while his enemies curse him for a hound or a mutt.

But all these zoological qualities in human beings are rather loosely figurative, and indeed often based on quite inaccurate fables. There are genuine resemblances between traits in man and his next of kin, the primates, which could well repay close observation and serious analysis by scientists, Prof. Earnest Hooton of Harvard holds, in his recent book, *Man's Poor Relations* (Doubleday Doran).

Prof. Hooton looks at the apes, monkeys and lemuroids from the viewpoint of the anthropologist. He has not done any research of his own on these several-times-removed cousins of ours, but has gathered all available data on both their bodily composition and their individual and social behavior: analogues, if you like, of physical and cultural anthropology. Regrettably, social studies on primates in the wild are but few and most of these are rather sketchy. Studies on cage behavior help somewhat; but one is left haunted with the feeling that in this case it is like studying sociology in a jail.

Best studied of Old World monkeys, apparently, are the baboons and the macaque; of monkeys in the New World, the spider and the howler genera. Both baboons and macaques, Prof. Hooton finds, are "totalitarians": unbridled egoists, fighting and bullying without restraint, killing females in ferocious sex battles, even pulling food out of the very mouths of helpless young ones. His descriptions remind one of the disgusted British civil servant's entries on a questionnaire about a certain African tribe: "Manners: none. Customs: nasty."

Howlers and spider monkeys behave much better—from the human point of view at least. They troop together amicably, their battles are mainly vocal (settling things by diplomacy?), the bigger ones sometimes help the smaller out of trouble. Prof. Hooton even styles them communistic; though from the descriptions it would be as easy to say they are tolerant, live-and-let-live individualists. At any rate, on the basis of what knowledge we have of them, it is possible to join Prof. Hooton in his confessed feeling of "solidarity" with the simians of our own hemisphere.

Science News Letter, May 15, 1943

ASTRONOMY

Comet Discovered in April Increasing in Brightness

➤ THE COMET discovered this spring by Miss L. Oterma, Finnish woman astronomer, is increasing in brightness. When first seen on April 8 at the Turku Observatory, in Finland, the comet was recorded to be of the fifteenth magnitude. Recent observations agree that it is now of the ninth magnitude.

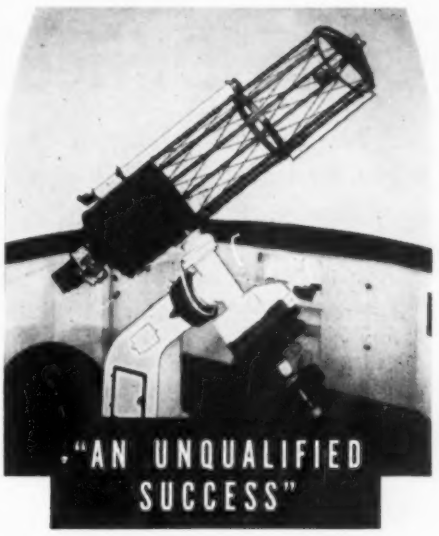
Miss Oterma's new data were relayed to Harvard College Observatory which is the central distributing agency for North America in the dissemination of information about new astronomical discoveries.

Early reports showed the comet in the constellation of Virgo, and moving slowly westward. Dr. Otto Struve, Director of the Yerkes Observatory, Williams Bay, Wis., reports that on April 30, at 10:42 p.m., EWT, the comet's right ascension was 12 hours, 9 minutes, 58 seconds, and its declination plus 2 degrees, 25 minutes, 10 seconds.

On May 2 at 10:45 p.m., EWT, the comet's right ascension was 12 hours, 8 minutes, and 13 seconds, while its declination was plus 2 degrees, 28 minutes. 57 seconds. From these reports it is observed that the comet is following the motion originally described for it by Miss Oterma.

Science News Letter, May 15, 1943

Garden *soil* to be ideal for plant growth should contain about 50% of solid matter, 25% water, and 25% air.



From Volume VIII, No. 6, Publications of The Observatory of The University of Michigan describing the Francis C. McMath Memorial 24-inch Reflecting Telescope, now in operation at the McMath-Hulbert Observatory of the University of Michigan.

"The mirrors were entrusted to The Perkin-Elmer Corporation. Our specifications were exacting, as no part of any surface could depart from the theoretical surface by more than one-tenth of a standard wavelength . . . Perkin-Elmer Corporation completed the primary mirror by conventional methods...It was then tested, pronounced well within the specifications, and found to have an unusually fine surface. The two high magnification secondaries, however, presented real difficulties. McCarthy, of Perkin-Elmer, felt that conventional methods of testing were inadequate and proposed a new method, which he has recently described. The Perkin-Elmer Corporation made up the necessary auxiliary optical equipment, and our two secondaries were figured by the new method, which eliminates the combined testing of primary and secondary. These two mirrors have been an unqualified success, both focal lengths being well within specifications, while the figuring is superb. Exposures for the disk of Jupiter are shorter by a factor of at least twelve when compared with our old 10½-inch telescope."

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PSYCHOLOGY

Code Difficulty Rated

"W" is hardest letter that soldiers studying radio code have to learn. Easiest are "E" and "T" which have only one sound.

➤ DIDAHDAH is the hardest code letter that soldiers have to learn—that's the letter W.

Dr. S. D. Spragg, of Queens College, Long Island, N. Y., told the Eastern Psychological Association in New York that letters with the greatest number of sound elements are not always the most difficult to learn; W has only three sounds.

The familiar V for Victory (didididah) is a fairly easy letter to master although it has the maximum of four sounds. In difficulty it ties with A (didah), having only two sounds.

All the code letters leading the list in difficulty with the exception of W do have four sounds, however. And the two easiest are E (dit) and T (dah), the two having only one sound.

This information is important in the teaching of code because in most modern methods of code instruction, the alphabet is taught in four or five groups, usually on the basis of alleged differences in difficulty.

Dr. Spragg decided that this could not be determined just by looking at the letters or listening to their code equivalents. His study of actual difficulties was made with a special code class of men and women at Queens College. They were taught the alphabet as a whole, not in groups. Dr. Spragg said that he did not select this method as being necessarily the best for service classes, but because it is the only way to get at the relative difficulty of the letters fairly. The college students did very well, however, with this method of instruction.

All errors made during the time of learning were counted and they ranged all the way from only 22 for the letter E to 666 for W. Most frequently confused were letters having the same sound except for the ending.

Code Teaching Studied

➤ THE NEW method of teaching code by having listeners to the code signals try to write the letter and then prompting or correcting them after a few seconds was compared with the old method of having them study a printed list of dots and dashes and the results were reported to the meeting by Dr. John P. Seward, of Connecticut College.

No dependable differences were found. There was a slight tendency for students of the prompting method to do better with practice and at higher rates of receiving. There was also a slight tendency for the poorer learners to do relatively better with the prompting method while the better learners did better with the dot-dash method. But none of these differences were great enough to be significant.

Two Heads Are Better

➤ TWO HEADS are really better than one when it comes to working out school arithmetic problems, Dr. Samuel F. Klugman of the University of Pennsylvania told the Eastern Psychological Association.

In an experiment on 136 boys and girls of average intelligence in grades 4, 5, 6, Dr. Klugman found that they can do more problems correctly when they work in pairs. It takes them longer, however, and the time differences were greatest for the sixth grade, the girls, Negroes and older children.

Science News Letter, May 15, 1943

A huge dolomite deposit near Las Vegas, Nev., is expected to produce many million tons of *magnesia*, raw material from which magnesium metal is obtained.

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"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. O. E. Baker, professor of geography at the University of Maryland, will discuss population problems.

ASTRONOMY

Arms of Nebulae Are Trailing Star Centers

➤ THE ARMS of spiral nebulae, those gigantic pinwheels of the universe, have been discovered to be trailing their central region by Dr. Edwin Hubble, Mt. Wilson Observatory astronomer and a world authority on nebulae. His investigation (*Astrophysical Journal*, March) is of importance in the study of the origin and development of nebulae, the most familiar of which is the Milky Way.

Spiral nebulae, comparable in size to our stellar system, are millions of light years away. Billions of stars, luminous gaseous matter, and dark clouds obscuring portions of the brilliant center form this whirlpool of light.

Dr. Hubble slips the missing piece of the puzzle into place by developing a criterion for determining the direction in which these whirling masses are inclined. We see them as images projected against space and whether they are tilted toward us or away would decide, in light of their spiral pattern, if the arms are trailing or leading.

It has been believed for some time that the dark lanes visible only on the slightly tilted nebulae are the key, but dispute arose as to whether they marked the far or near side. Working with the entire collection of Mt. Wilson photographs, including those made with the aid of the famous 100-inch telescope, Dr. Hubble eventually found a spiral nebula which showed both the dark lanes and the spiral pattern. The dark lines were silhouetted against the central or nuclear bulge, showing that the dark bands unmistakably denote the nearer side. Other nebulae studied support his assumption that the arms were trailing.

From the slant of the spectral lines it is known that all spiral nebulae are traveling in the same direction. Having once determined that direction, Dr. Hubble concluded that the arms of the nebulae are trailing in all spirals.

Science News Letter, May 15, 1943

About 7,000 species of *flies* are found in North America.

• New Machines and Gadgets •

QUICK-FROZEN baked beans are now wrapped in cellophane and packed in paperboard containers. All the housewife needs to do is heat the beans for a few minutes. One firm producing 40,000 pounds a week plans to double this figure soon.

Science News Letter, May 15, 1943

A NEW ADHESIVE holds heavy masking paper in place to protect highly-polished surfaces of transparent plastic enclosures on aircraft against scratching and marring during shipment and assembling. When protection is no longer needed the adhesive permits the paper to be stripped off easily and cleanly.

Science News Letter, May 15, 1943

AN AIR-COOLED welder tip has been perfected by a workman in a western aircraft factory where a great deal of welding is being done. The welder tip is "finned" with dural, a metal alloy, which keeps the handle and mixing chamber cool and prolongs the life of the tip.

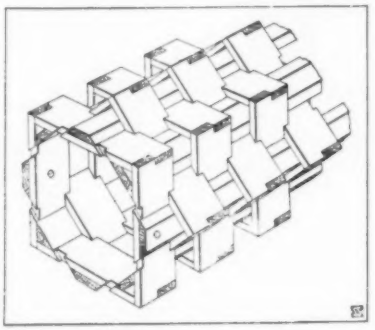
Science News Letter, May 15, 1943

AN ELECTRIC PLUG is made with a small lever placed between the prongs which automatically breaks the circuit in case of overloading, short circuit, or motor stalling on the extension line. The lever is actuated by heat. After a circuit break the lever is easily pushed back into position.

Science News Letter, May 15, 1943

A WOODEN CULVERT, octagonal in shape on the inside, is a recently patented invention which saves metal. It is an assembly of identically cut pieces of wood which interlock in slots cut in the pieces as shown in the illustration. The whole is held together by four flat beveled strips without nails, screws or bolts.

Science News Letter, May 15, 1943



A NEW BLACKOUT street lamp invisible to enemy fliers, gives light enough to keep a person on his homeward path. It permits a person to make out the figure of another pedestrian 40 feet away. The shade is of plastic and cast iron. The light is about one-sixtieth as bright as the full moon.

Science News Letter, May 15, 1943

WET CONCRETE may be sealed and the moisture locked in it during setting by a new clear liquid. It is sprayed on the concrete immediately after finishing. Its use in highway construction is said to produce the equivalent of 14-day water-cure without the labor and expense of hauling earth, applying water, and other steps necessary in the water-cure method.

Science News Letter, May 15, 1943

A NEW TYPE of Army jungle boot is made with uppers of green canvas and soles of heavy rubber with cleats. It is designed to protect the soldier during fighting in underbrush and while marching in rough mountainous country.

Science News Letter, May 15, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 156.*

ENGINEERING

High-Frequency Field Used in Metal Work

➤ HIGH-FREQUENCY electric field heating in the interior of materials is now used in case-hardening metal machine parts, in the manufacture of plywood and in many other industrial operations. Developed only within the past few years, it is a process similar to the one used by physicians in electro-therapy, in which heat is applied internally to parts of the body. "Penetrating heat" it has sometimes been called by them, to distinguish it from surface heat.

The manufacturing of plywood illustrates how the high-frequency electric field is used. A metal sheet, connected to one terminal of a high-frequency transformer, is placed in the center of a stack of glue-coated veneer sheets two or more feet high. The other terminal is connected to the upper and lower plates of the plywood press itself. Pressure is applied, and at the same time electric energy sent from the middle metal sheet to the plates of the press. The heat sets the glue. Two heavy slabs of plywood may be formed, or many separated plywood boards may result, depending upon the glue application.

In this interior heating, a high-frequency electronic oscillatory system is generally used. It is basically similar to a radio transmitter but usually more powerful. The oscillator is operated on direct current, and gives an alternating current of frequencies from a few cycles to many millions per second, depending upon the setup. In passing from one terminal to the other, much of the electric energy is turned into heat.

Case-hardening of small machine parts such as gears and bearings is now being done by a similar electric heating process. In case-hardening only the surface wearing area is hardened.

Tinplate, applied to other metals by the electrolytic method, requires polishing. This also is now done by a similar high-frequency electric field process.

Other uses include the heat treatment of tobacco without removing it from the hogshead, and the killing of insects in grains and cereals. Other industrial uses are made of the process, and many additional ones are promised for the near future.

Science News Letter, May 15, 1943

The *shipbuilding* industry was the largest user of steel in the United States in 1942.

Cutworms, which destroy many vegetable gardens, have been called "fifth columnists" because they work in the dark.

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First Glances at New Books

➤ A MUST READ book for the list of any person who really wants to know why people act, think and feel the way they do is MIND, MEDICINE AND MAN, by Gregory Zilboorg (*Harcourt, Brace and Company*, $3.50). The author is not only an experienced psychiatrist but a skillful writer. He presents this very complex and difficult subject clearly and vividly. The book requires careful reading and even study by the layman, but the effort will be fully repaid by the greater understanding he will gain of himself and his fellows, of crime, of mental sickness, of Freud's teachings and the controversies over them, and of many of the problems of our present troubled world.

Science News Letter, May 15, 1943

➤ PIONEERS in American aviation were THE WRIGHT BROTHERS, by Fred C. Kelly (*Harcourt, Brace*, $3.50). This well written and timely biography, authorized by Orville Wright, sets forth many facts concerning these two aeronautic experts never before published.

Science News Letter, May 15, 1943

➤ PICTURE MAP GEOGRAPHY OF MEXICO, CENTRAL AMERICA AND THE WEST INDIES, by Vernon Quinn, is the long title for a one-hundred-page description of these countries beautifully illustrated with picture maps. For school and library use. (*Lippincott*, $2.00)

Science News Letter, May 15, 1943

➤ A HOUSING BOOM is expected in many countries, post-war economics permitting. What British homemakers would like to have is revealed in the Advertising Service Guild's survey report on PEOPLE'S HOMES (*John Murray*, distributed by *Transatlantic Arts*, $3). This data not only gives an insight of the British way of life but will be of interest to sociologists, architects and others interested in housing problems.

Science News Letter, May 15, 1943

➤ THE DRAMATIC STORY of THE COTTON INDUSTRY (*Longmans, Green and Co.*, $1.75) is clearly related for young people by Josephine Perry in the fifth book of the America at Work series. It traces the development of cotton culture, tells of the ingenious inventions for field and factory, points out its many uses in our daily lives and concludes with information on by-products. It's all told in big readable type and well-illustrated.

Science News Letter, May 15, 1943

➤ YOUNG PEOPLE, especially scientifically-minded girls, will enjoy this well written biography of AMERICAN WOMEN OF SCIENCE, by Edna Yost (*Frederick A. Stokes*, $2). This is the first book to be written covering the field of scientific contributions by U. S. women.

Science News Letter, May 15, 1943

➤ LABOR, NOT LUCK, was the common denominator in the lives of AMERICA'S GREATEST INVENTORS (*Thomas Y. Crowell Co.*, $2). John C. Patterson tells the story of the lives and achievements of 18 inventors selected by a committee of leading scientists and industrialists.

Science News Letter, May 15, 1943

➤ TO AID the vitally important job of protecting the health of the 17,000,000 or more workers in war industries, the division of industrial hygiene of the National Institute of Health, U. S. Public Health Service, has prepared a highly useful and practical volume, MANUAL OF INDUSTRIAL HYGIENE (*W. B. Saunders Company*, $3). Doctors and nurses new to the field of industrial hygiene, and engineers and management faced with new problems because of new production methods and new types of employees, such as women, older workers and handicapped workers, will find this compact, clearly written book especially valuable. It is issued under the auspices of the National Research Council.

Science News Letter, May 15, 1943

• Just Off the Press •

AIRPLANE HYDRAULIC SYSTEMS: Their Operation and Maintenance. A manual for mechanics—Hugh C. Aument, Jr.—*Ronald Press*, 120 p., $2.25.

AMERICA'S GREATEST INVENTORS—John C. Patterson—*Crowell*, 240 p., $2.

BEHAVIOR AND NEUROSIS: An Experimental Psychoanalytic Approach to Psychobiologic Principles—Jules H. Masserman—*Univ. of Chicago Press*, 269 p., $3.

COMPLETE BOOK OF HOME CANNING: Including Preserving, Pickling, Dehydration and Jelly-Making—Demetria M. Taylor—*Greenberg*, 164 p., illus., $2.

CULTURAL AND RACIAL VARIATIONS IN PATTERNS OF INTELLECT: Performance of Negro and White Criminals on the Bellevue Adult Intelligence Scale—Solomon Machover—*Teachers College, Columbia Univ.*, 91 p., $1.60.

DOUBLE-QUICK COOKING, FOR PART-TIME HOMEMAKERS—Ida Bailey Allen — M. *Barrows*, 441 p., $2. For housekeepers with limited time for preparing meals.

GLOSSARY OF SHIPBUILDING AND OUTFITING TERMS — Walter J. Eddington — *Cornell Maritime Press*, 435 p., $3.50.

IS GERMANY INCURABLE — Richard M. Brickner—*Lippincott*, 318 p., $3.

JOURNEY AMONG WARRIORS—Eve Curie—*Doubleday, Doran*, 501 p., $3.50.

LIBERTY, EMPLOYMENT, AND NO MORE WARS—Theodore E. Quinn—*Hastings House*, 241 p., $2.50. The president of an advertising agency proposes a "national economic senate" organized by Industry and Commerce in which "Labor need not be initially included."

MATHEMATICS DICTIONARY—Glenn James and Robert C. James—*Digest Press*, 320 p., illus., $3. The only book of its kind now published which includes standard definitions and formulas.

MICRURGICAL AND GERM-FREE TECHNIQUES: Their Application to Experimental Biology and Medicine, A Symposium — James A. Reyniers — *Charles C. Thomas*, 274 p., illus., $5.

NURSES IN ACTION: The Story of the Army Nurse Corps—Julia O. Flikke—*Lippincott*, 239 p., illus., $2.50.

SCIENCE FROM SHIPBOARD: A simple manual of information and instruction for those who cross the sea in ships to fight for freedom—Prepared by a group of scientific writers and artists under the guidance of the Boston-Cambridge branch of the American Association of Scientific Workers—*Science Service*, 268 p., illus., 25c.

SOMATIC AND ENDOCRINE STUDIES OF PUBERAL AND ADOLESCENT BOYS—William Walter Greulich, Ralph I. Dorfman, Hubert R. Catchpole, Charles I. Solomon, Charles S. Culotta—*Society for Research in Child Development, National Research Council*, 85 p., illus., $1.50. Monographs of the Society for Research in Child Development, vol. VII, serial no. 33, no. 3.

STEREOPIX: The Principles of Celestial Navigation Explained by Means of Three-dimensional Pictures — Wm. H. Barton, Jr.—*Addison-Wesley*, 28 p., col. charts, $1.50.

THE THEORY AND PRACTICE OF SEMIMICRO QUALITATIVE ANALYSIS—G. B. Heisig—*Saunders*, 331 p., illus., $2.50. Textbook.

VICTORIES OF ARMY MEDICINE: Scientific Accomplishments of the Medical Department of the United States Army—Edgar Erskine Hume—*Lippincott*, 250 p., illus., $3.

THE WRIGHT BROTHERS—Fred C. Kelly—*Harcourt, Brace*, 340 p., illus., $3.50.

YOU'LL EAT IT UP—Charlotte Adams—*Barrows*, 308 p., $2.50. "A menu for every day and every occasion."